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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,524	08/24/2006	Steffen Wittmann	2006_1269A	7376

52349 7590 02/23/2011

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EXAMINER	
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ART UNIT	PAPER NUMBER
4163	

NOTIFICATION DATE	DELIVERY MODE
02/23/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/590,524	WITTMANN ET AL.	
	Examiner	Art Unit	
	JEFFERY WILLIAMS	4163	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 19 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 19 is directed towards non-statutory subject matter because it is directed to a program. The claim lacks the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 U.S.C. 101. They are clearly not a series of steps or acts to be a process nor are they a combination of chemical compounds to be a composition of matter. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material *per se*.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-4, 7-19 are rejected under 35 U.S.C. 102 (a) as being anticipated by Richardson (H.264 and MPEG-4 Video Compression: Video Coding for the Next -Generation Multimedia).

Regarding claim 1, Richardson discloses a motion compensation method comprising:

interpolating sub-pixels in a reference picture (see pg. 173, para. 2) ; and performing motion compensation based on the interpolated reference picture (see pg. 160, Fig. 6.1, MC block), wherein the interpolating includes:

a first calculation step of calculating base values which are bases of sub-pixel values of the sub-pixels by multiplying coefficients with pixel values of pixels included in the reference picture (see page 173, equation b=round((E-5F+20G+20H-5I+J)/32); and

a first rounding step of deriving the sub-pixel values of the sub-pixels by rounding the base values calculated in the first calculation step instead of directly using the base values in calculating sub-pixel values of other sub-pixels(see page 173, equation b=round((E-5F+20G+20H-5I+J)/32) , and the performing of motion compensation includes performing motion compensation based on the reference picture having the interpolated sub-pixels with the correspondingly derived sub-pixel values (see pg. 160, Fig. 6.1, MC block),.

Regarding claim 2, Richardson discloses the motion compensation method according to claim 1, wherein the first calculation step includes

calculating base values of sub-pixels to be interpolated in a first direction (see pg. 174, Fig. 6.15 part 1), and

the first rounding step includes deriving sub-pixel values of the sub-pixels to be interpolated in the first direction by rounding the base values calculated in the first calculation step (see pg. 174, eq. a=round((G+b)/2).

Regarding claim 3, the motion compensation method according to Claim 2, wherein the interpolation further includes:

a second calculation step of calculating, using the sub-pixel values of the sub-pixels derived in the first rounding step, base values of sub-pixels to be interpolated in a second direction that is different from the first direction (page 174, Fig. 6.15 part 2); and

a second rounding step of deriving the sub-pixel values of the sub-pixels to be interpolated in the second direction by rounding the base values calculated in the second calculation step (see pg. 174, eq. a=round((G+b)/2).

In Fig 6.15, the value of pixel f is calculated in a second direction using the pixel value of b, which was calculated in the first direction. In both examples, the pixel values are rounded using the above mentioned equation with the appropriate pixel letters substituted. For example b=round((E-5F+20G+20H-5I+J)/32)) and f = round ((b + j) / 2).

Regarding claim 4, Richardson discloses the motion compensation method according to claim 3, wherein the first calculation step includes calculating three base values of a-fourths sub-pixels that are arrayed in the second direction (page 174, Fig. 6.15 part 2 pixels d, f and q), and the second calculation step includes calculating three base values of a-fourths sub-pixels that are arrayed in the second direction (See pg. 173, eq. b=round((E-5F+20G+20H-5I+J)/32)).

Richardson goes into detail in describing how to find the base value of one a-fourths sub-pixel (pixel b). However, using the equation that Richardson gives to find the sub- pixel value of pixel b, any number of sub pixels can be calculated.

Regarding claim 7, Richardson discloses the motion compensation method according to claim 6, wherein the first calculation step includes calculating base values of the sub-pixels to be interpolated in a horizontal direction, the horizontal direction being determined as the first direction, and the second calculation step includes calculating base values of the sub-pixels to be interpolated in a vertical direction, the vertical direction being determined as the second direction (see pg. 174, Fig. 6.15 parts 1 and 2).

Regarding claim 8, Richardson discloses the motion compensation method according to claim 4, further comprising a bilinear filtering of raising a sub-pixel accuracy by applying bilinear filtering to the reference picture having the interpolated sub-pixels with the correspondingly derived sub-pixel values (see page 173, last paragraph).

Regarding claim 9, Richardson discloses the motion compensation method according to claim 8, wherein the bilinear filtering includes raising the sub-pixel accuracy of the reference picture from a a-fourths sub-pixel accuracy to an a-eighths sub-pixel accuracy (see pg. 174, last paragraph, pg.175, Fig. 6.17 and equations).

Regarding claim 10, Richardson discloses the motion compensation method according to claim 1, wherein the first rounding step includes rounding the base values of the sub-pixels by means of downshifting (see pg. 191, Quantization section and 192, eq.6.7 and the last sentence).

In the Quantization section on page 191, Richardson states “the rounding operation here (and throughout this section) need not round to the nearest integer; for example, biasing the 'round' operation towards smaller integers can give perceptual quality improvements.

Regarding claim 11, The motion compensation method according to claim 1, wherein the first calculation step includes calculating base values of sub-pixels that should be arrayed in a horizontal direction and in a vertical direction by multiplying coefficients with pixel values of pixels included in the reference picture (see pg. 173, para. 2 sentence 1 and pg. 174, Fig. 6.15 parts 1 and 2 and eq. b=round((E-5F+20G+20H-5I+J)/32)).

Regarding claim 12, Richardson discloses a motion estimation method comprising:

interpolating sub-pixels in a reference picture (see pg.159, last

paragraph); and

performing motion estimation based on the interpolated reference picture (see pg. 160, Fig. 6.1, ME block),

wherein the interpolating includes:

a calculation step of calculating base values which are bases of sub-pixel values of the sub-pixels by multiplying coefficients with pixel values of pixels included in the reference picture (see page 173, equation b=round((E-5F+20G+20H-5I+J)/32); and

a rounding step of deriving the sub-pixel values of the sub-pixels by rounding the base values calculated in the calculation step instead of directly using the base values in calculating sub-pixel values of other sub-pixels (see page 173, equation b=round((E-5F+20G+20H-5I+J)/32) , and the performing of motion estimation includes

performing motion estimation based on the reference picture having the interpolated sub-pixels with the correspondingly derived sub-pixel values (see pg. 160, Fig. 6.1, ME block), .

Regarding claim 13, Richardson discloses a moving picture coding method comprising:

obtaining a picture to be coded (see pg. 160, Fig. 6.1, block Fn);

interpolating sub-pixels in a reference picture (see pg.159, last paragraph);

performing motion compensation based on the interpolated reference picture (see pg. 160, Fig. 6.1, MC block) ; and

coding a picture based on the reference picture (see pg. 160, Fig 6.1, T, Q, Reorder and Entropy encode blocks), wherein the interpolating includes:

a calculation step of calculating base values which are bases of sub-pixel values of the sub-pixels by multiplying coefficients with pixel values of pixels included in the reference picture (see page 173, equation b=round((E-5F+20G+20H-5I+J)/32) ; and

a rounding step of deriving the sub-pixel values of the sub-pixels by rounding the base values calculated in the calculation step instead of directly using the base values in calculating sub-pixel values of other sub-pixels (see page 173, equation b=round((E-5F+20G+20H-5I+J)/32) , and

the performing of motion compensation includes

performing motion compensation of the picture based on the reference picture having the interpolated sub-pixels with the correspondingly derived sub-pixel values (see pg. 160, Fig. 6.1, MC block), and

the coding includes

coding a differential between the picture to be coded that has been obtained in the picture obtaining and the reference picture of which motion compensation has been performed in the performing of motion compensation (see pg 160, Fig. 6.1, F'n-1 block).

Regarding claim 14, Richardson discloses a moving picture decoding method comprising:

obtaining a differential picture that is a resultant from coding the differential between a picture and another picture (see pg. 161, D'n);

interpolating sub-pixels in a reference picture;

performing motion compensation based on the interpolated reference picture (see pg. 161, Fig. 6.2, block MC); and

decoding a coded picture based on a reference picture (see pg. 161, Fig. 6.2, Entropy decode block) wherein the interpolating includes:

a calculation step of calculating base values which are bases of sub-pixel values of sub-pixels by multiplying coefficients with pixel values of pixels included in the reference picture (see page 173, equation b=round((E-5F+20G+20H-5I+J)/32) ; and

a rounding step of deriving the sub-pixel values of the sub-pixels by rounding the base values calculated in the calculation step instead of directly using the base values in calculating sub-pixel values of other sub-pixels (see page 173, equation b=round((E-5F+20G+20H-5I+J)/32), the performing of motion compensation includes

performing motion compensation of the picture based on the reference picture having the interpolated sub-pixels with the correspondingly derived sub-pixel values (see pg. 161, Fig. 6.2, MC block), and the decoding includes

decoding the differential picture obtained in the differential picture obtaining and adding the decoded differential picture to the reference picture of

which motion compensation has been performed in the performing of motion compensation (see pg. 161, Fig. 6.2, F'n block).

Regarding claim 15, the limitations of claim 15 are rejected in the analysis of claim 1, and claim 15 is rejected on that basis.

Regarding claim 16, the limitations of claim 16 are rejected in the analysis of claim 12, and claim 16 is rejected on that basis.

Regarding claim 17, the limitations of claim 17 are rejected in the analysis of claim 13, and claim 17 is rejected on that basis.

Regarding claim 18, the limitations of claim 18 are rejected in the analysis of claim 14, and claim 18 is rejected on that basis.

Regarding claim 19, rejection of claim 1 is incorporated here within. The calculation step and the rounding step is interpreted to be the program claimed in the present application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson in view of Sekiguchi et al. (US 2008/0084930).

Regarding claim 5, Richardson discloses the motion compensation method according to claim 4.

Richardson discloses all of the subject matter of the claimed invention with the exception of the first calculation step includes calculating the base values of three a-fourths sub-pixels using the following equations when eight pixel values of pixels arrayed in the first direction are represented as A, B, C, D, E, F, G and H respectively and the three a-fourths sub-pixel values are represented as hi, h2 and h3 respectively:

h1 =-l.A+3.B-lO.C+59.D+18.E-6.F+l.G-O.H;

h2 =-l.A+4.B-lO.C+39.D+39.E-lO.F+4.G-1.H;and

h3 =-O.A+l.B-6.C+18.D+59.E-lO.F+3.G-1.H.

Sekiguchi et al. from the same or similar fields of endeavor teaches the above limitation (see pg. 1, col. 2 , [0007]). Sekiguchi discloses a general formula for finding sub pixel values in the horizontal direction. However, one with ordinary skill in the art at the time of the invention would have been able to use the general equation to find 3 a-fourths sub pixel values. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the general equation disclosed by Sekiguchi et al. within the disclosure of Richardson to find three a- fourths sub pixel values, substituting coefficients which would satisfy the equations in the present application, to reduce the operation workload and the simplification of hardware.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Richardson in view of Sekiguchi et al. (US 2008/0084930) and further in view of Etoh et al. (US 20050063466).

Regarding claim 6, the rejection of claim 5 is incorporated here within. The rejection of claim 5, however, does not disclose the second calculation step includes calculating the base values of three a-fourths sub-pixels using the following equations when eight pixel values of pixels arrayed in the second direction are represented as D1, D2, D3, D4, D5, D6, D7 and D8 respectively and the three a-fourths sub-pixel values are represented as vl, v2 and v3 respectively:

$v, = -3.D_1 + 12.D_2 - 37.D_3 + 229.D_4 + 71.D_5 - 21.D_6 + 6.D_7 - 1-/)8;$

$v_2 = -3.D\sim + 12-D_2 - 39-D_3 + 158.D_4 + 158.D_5 - 39.D_6 + 12.D_7 - 3.D_8$ *;and*

$v_3 = -I.D\sim + 6.D_2 - 21.D_3 + 71-D_4 + 229-D_5 - 37-D_6 + 12.D_7 - 3-D_8.$

Etoh et al. from the same or similar field of endeavor teaches the above limitation (see pg. 21, [0344-[0349]. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to use the above equations to find the base values of three a-fourths sub pixels to reduce the operation workload and the simplification of hardware.

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Monroe et al. (US 2006/0067404).

- Wedi (ITU-T VCEG-M44)
- Srinivasan et al. (US 2003/0194009)

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFERY WILLIAMS whose telephone number is (571)270-7579. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dang Ton can be reached on (571)272-3171. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Marsha D. Banks-Harold/
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